MULTIMEDIA UNIVERSITY

STUDENT IDENTIFICATION NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

T3, 2017/ 2018

BCN7104 – COMPUTER NETWORK AND INTERNET PROGRAMMING

(MBA Full Time)

6 JUNE 2018
9.00 a.m – 12.00 p.m
(3 Hours)

INSTRUCTIONS TO STUDENTS

1. This question paper consist of **FOUR (4)** pages (including the cover page).

2. Answer **ALL** questions. The marks distributions are given in parentheses.

3. Write all your answers in the **Answer Booklet** provided.

QUESTION 1

This question is about the ISO Reference Model and the TCP/IP protocol stack.

a) The OSI Reference Model defines seven protocol layers, each of which is responsible for a specific range of functions. By considering this model, mention two main functions performed by a protocol operating at the network layer. (2 Marks)

b) Give the names of the seven layers of the OSI Reference Model and the names of the four corresponding layers in the TCP/IP protocol stack, showing the correspondence explicitly. (11 marks)

c) Figure 1 shows a small scale network comprising one switch and one router. A personal computer is connected to the switch and a server is connected to the router. All switch and router ports are IEEE 802.3 CSMA/CD.

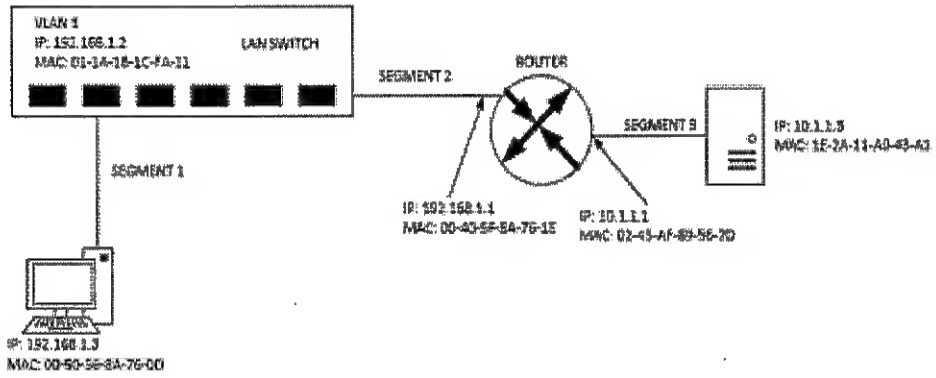

Figure 1

For this network, consider data being sent from the personal computer to the server and indicate the values of the source and destination address fields of the frame and the IP header for each segment. (12 marks)

QUESTION 2

This question is about providing global network services.

a) What is the difference in the service offered to applications by the TCP and UDP protocols? (7 marks)

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b) Companies that have offices in several countries around the globe need to create a private corporate network that is able to connect these sites together and transport traffic of different types between them. An increasingly popular way of providing such a network is to use Multiprotocol Label Switching (MPLS) data services. Briefly explain how MPLS works and how it is able to support different traffic types.
(12 marks)

c) An alternative to MPLS might be to consider using the Internet. What are the main disadvantages of the Internet that mean it would offer a worse solution than MPLS?
(6 marks)

QUESTION 3

Design and describe an application-level protocol to be used between an automatic teller machine and a bank's centralized computer. Your protocol should allow a user's card and password to be verified, the account balance (which is maintained at the centralized computer) to be queried, and an account withdrawal to be made (that is, money disbursed to the user). Your protocol entities should be able to handle the all-too-common case in which there is not enough money in the account to cover the withdrawal. Specify your protocol by listing the messages exchanged and the action taken by the automatic teller machine or the bank's centralized computer on transmission and receipt of messages. Sketch the operation of your protocol for the case of a simple withdrawal with no errors, using a diagram. Explicitly state the assumptions made by your protocol about the underlying end-to-end transport service. (25 marks)

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QUESTION 4

Infotronics is a private college that provides part-time and full-time courses in IT and Business. It is planning to move to a new site and is considering the networking that should be installed. The site consists of three buildings. The Grace Hopper building contains a dedicated computer room with a number of high performance dedicated servers. The servers provide services to students and staff who may access them either over the Internet or over the College's own internal network. The Maurice Wilkes Building B contains the staff offices, for both lecturers and administrative staff. They have desktop computers on fixed desks, from which they need access to the Internet and to other college servers. The Hopper building and the Wilkes building are linked by an underground duct. The Alan Turing Building C contains a receptionist desk, lecture rooms and a café. There is no duct linking it to other buildings. The lecture rooms have desktop computer at the front for use by the lecturers, but some lecturers prefer to use their own laptop or tablet computer. All the students use laptop or tablet computers to take notes and keep in touch with their friends.

a) What type of network should be deployed in the Grae Hopper Building and what equipment should be installed? (5 marks)

b) What type of network should be deployed in the Maurice Wilkes Building and what equipment should be installed? (5 marks)

c) What type of network should be deployed in the Turing Building and what equipment should be installed? (5 marks)

d) What type of network connections should be used to link the buildings together, where, and how should the College's Internet connection be made? (10 marks)

End of Paper